

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 11-335858

(43)Date of publication of application : 07.12.1999

(51)Int.Cl. C23C 18/44
C23C 18/28

(21)Application number : 10-161489

(71)Applicant : SHIKAMATA YUJI
YAMAMURA OSAMU

(22)Date of filing : 27.05.1998

(72)Inventor : SHIKAMATA YUJI
MATSUDO YUICHI
MIYOSHI KATSUNORI
TAKAHAGI AKIHIRO

(54) FORMATION OF SILVER PLATING SURFACE AND SOLUTION USED THEREFOR

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain a silver plating surface on a metal, a synthetic resin, rubber, glass, porcelain, wood, leather, stone, gypsum, rattan, wheat straw or the like by a spraying method instead of a plating bath method.

SOLUTION: In forming a silver plating surface through steps of substrate adjustment, activating treatment, washing with water, reduction reaction with a metallic salt, the silver plating surface is formed by the activating treatment by blowing an activating agent contg. stannous chloride and a noble metallic salt of palladium, gold, silver or the like and by simultaneously blowing a silver plating reaction-processing agent consisting of a solution contg. a metallic salt solution and a solution contg. a reducing agent.

LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

* NOTICES *

JPO and NCIP are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] The substrate which forms a silver mirror plane is adjusted and activation is performed to this substrate. Subsequently It is the approach of carrying out rinsing processing, making a metal salt and a reducing agent react, and forming a silver mirror plane. Activation (bitter taste tee bay TINGU) is performed by spraying the activation agent containing noble-metals salts, such as stannous chloride, palladium, gold, and silver, with a spray method. Moreover, the formation approach of the silver mirror plane characterized by spraying a simultaneous target with a spray method, respectively in the silver-mirror-reaction processing agent which consists of a metal salt content solution and a reducing-agent content solution.

[Claim 2] Said activation agent is the formation approach of the silver mirror plane according to claim 1 characterized by containing a hydrochloric acid 10 thru/or 40 cc, 1.5g of stannous chloride, 5g, 0.001g of palladium chlorides, and 0.005g to 1l. of water.

[Claim 3] Said silver-mirror-reaction processing agent is the formation approach of the silver mirror plane according to claim 1 characterized by consisting of a reducing-agent content solution containing 1g of tartaric acids, 4.5g, glucose 10g or 50g, formaldehyde 0.05g, or 3.5g to 1l. of water to the metal salt content solution containing 6.0g of sodium hydroxides, 25g, ammonia 20g or 70g, 2g of silver nitrates, and 20g, and 1l. of water.

[Claim 4] The substrate which forms a silver mirror plane is adjusted and activation is performed to this substrate. Subsequently It is the approach of carrying out rinsing processing, making a metal salt and a reducing agent react, and forming a silver mirror plane. Activation (bitter taste tee bay TINGU) is performed by spraying the activation agent containing noble-metals salts, such as stannous chloride, palladium, gold, and silver, with a spray method. moreover, as an activation agent in the formation approach of the silver mirror plane characterized by spraying a simultaneous target with a spray method, respectively in the silver-mirror-reaction processing agent which consists of a metal salt content solution and a reducing-agent content solution The solution of hydrochloric acid characterized by containing a hydrochloric acid 10 thru/or 40 cc, 1.5g of stannous chloride, 5g, 0.001g of palladium chlorides, and 0.005g to 1l. of water.

[Claim 5] The substrate which forms a silver mirror plane is adjusted and activation is performed to this substrate. Subsequently It is the approach of carrying out rinsing processing, making a metal salt and a reducing agent react, and forming a silver mirror plane. Activation (bitter taste tee bay TINGU) is performed by spraying the activation agent containing noble-metals salts, such as stannous chloride, palladium, gold, and silver, with a spray method. moreover, as a silver-mirror-reaction processing agent in the formation approach of the silver mirror plane characterized by spraying a simultaneous target with a spray method, respectively in the silver-mirror-reaction processing agent which consists of a metal salt content solution and a reducing-agent content solution As opposed to the metal salt content solution which contains 6.0g of sodium hydroxides, 25g, ammonia 20g or 70g, 2g of silver nitrates, and 20g to 1l. of water, and 1l. of water The reducing-agent content solution containing 1g of tartaric acids, 4.5g, glucose 10g or 50g, formaldehyde 0.05g, or 3.5g.

[Translation done.]

*** NOTICES ***

JPO and NCIP are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]**[0001]**

[Field of the Invention] This invention relates to solutions, such as a metal salt especially used for the base material used for inside-of-a-house accessories, autoparts, a home electrical machinery and apparatus, Buddhist instruments, furniture, accessories, etc. with a spray method in the approach of forming a silver mirror plane, the approach of forming a silver mirror plane in a metal, synthetic resin, rubber, glass, pottery, timber, leather, a stone, gypsum fibrosum, rattan, straw, etc., and the starting spray method.

[0002]

[Description of the Prior Art] Conventionally, the method of giving electroless plating to plastics, such as ABS plastics, thru/or its pretreatment approach are learned. This chemical plating etc. becomes an etching reagent from 15 thru/or the process which is immersed for 30 minutes, and roughens a front face, next is immersed in the bath of the solution of hydrochloric acid of stannous chloride, is immersed in the activation bath after rinsing, rinses further, raises from the plating bath 5 thru/or after being immersed for 10 minutes to a plating bath, rinses, and is dried about plastics first.

[0003] Since the plated object was immersed in the plating bath for every process according to the aforementioned chemical plating, the time amount which takes a big tooth space to install a plating bath, and a process takes was taken, further, the maintenance took time and effort and there were problems, such as also becoming the cause of a cost rise.

[0004]

[Problem(s) to be Solved by the Invention] This invention improves the above troubles, replaces them with a plating bath, and aims at offering the processing agent used with a spray method in the approach of forming a silver mirror plane in a metal, synthetic resin, rubber, glass, pottery, timber, leather, a stone, gypsum fibrosum, rattan, straw, etc., and the starting spray method.

[0005]

[Means for Solving the Problem] In order to solve the aforementioned technical problem, this invention adjusts the substrate which forms a silver mirror plane, and performs activation to this substrate. Subsequently It is the approach of carrying out rinsing processing, making a metal salt and a reducing agent react, and forming a silver mirror plane. Activation (bitter taste tee bay TINGU) is performed by spraying the activation agent containing noble-metals salts, such as stannous chloride, palladium, gold, and silver, with a spray method. Moreover, it considers as the formation approach of the silver mirror plane characterized by spraying a simultaneous target with a spray method, respectively in the silver-mirror-reaction processing agent which consists of a metal salt content solution and a reducing-agent content solution.

[0006] Moreover, in order to solve the aforementioned technical problem, as for this invention, it is desirable to consider as the formation approach of the silver mirror plane characterized by said activation agent containing a hydrochloric acid 10 thru/or 40 cc, 1.5g of stannous chloride, 5g, 0.001g of palladium chlorides, and 0.005g to 1l. of water.

[0007] In order to solve the aforementioned technical problem, moreover, this invention As opposed to the metal salt content solution with which said silver-mirror-reaction processing agent contains 6.0g of sodium hydroxides, 25g, ammonia 20g or 70g, 2g of silver nitrates, and

20g to 1l. of water, and 1l. of water It is desirable to consider as the formation approach of the silver mirror plane characterized by consisting of a reducing-agent content solution containing 1g of tartaric acids, 4.5g, glucose 10g or 50g, formaldehyde 0.05g, or 3.5g.

[0008] In order to solve the aforementioned technical problem, moreover, this invention The substrate which forms a silver mirror plane is adjusted and activation is performed to this substrate. Subsequently It is the approach of carrying out rinsing processing, making a metal salt and a reducing agent react, and forming a silver mirror plane. Activation (bitter taste tee bay TINGU) is performed by spraying the activation agent containing noble-metals salts, such as stannous chloride, palladium, gold, and silver, with a spray method. moreover, as an activation agent in the formation approach of the silver mirror plane characterized by spraying a simultaneous target with a spray method, respectively in the silver-mirror-reaction processing agent which consists of a metal salt content solution and a reducing-agent content solution It considers as the solution of hydrochloric acid characterized by containing a hydrochloric acid 10 thru/or 40 cc, 1.5g of stannous chloride, 5g, 0.001g of palladium chlorides, and 0.005g to 1l. of water.

[0009] In order to solve the aforementioned technical problem, moreover, this invention The substrate which forms a silver mirror plane is adjusted and activation is performed to this substrate. Subsequently It is the approach of carrying out rinsing processing, making a metal salt and a reducing agent react, and forming a silver mirror plane. Activation (bitter taste tee bay TINGU) is performed by spraying the activation agent containing noble-metals salts, such as stannous chloride, palladium, gold, and silver, with a spray method. moreover, as a silver-mirror-reaction processing agent in the formation approach of the silver mirror plane characterized by spraying a simultaneous target with a spray method, respectively in the silver-mirror-reaction processing agent which consists of a metal salt content solution and a reducing-agent content solution As opposed to the metal salt content solution which contains 6.0g of sodium hydroxides, 25g, ammonia 20g or 70g, 2g of silver nitrates, and 20g to 1l. of water, and 1l. of water It considers as the reducing-agent content solution containing 1g of tartaric acids, 4.5g, glucose 10g or 50g, formaldehyde 0.05g, or 3.5g.

[0010]

[Function] By the stannous chloride used for the activation of this invention serving as the first tin ion of reducibility in the solution of hydrochloric acid, and metal-ion-izing noble-metals salts, such as palladium, gold, and silver, in a solution, and on the other hand, spraying both liquid with a spray method, it is returned, the metal ion of these noble metals deposits on the surface of a base material as a metal, and the first tin ion oxidizes to the second tin ion. This depositing metal, especially palladium are rich in activity, and excellent in the operation which sticks a silver mirror plane to a base material.

[0011] Although immersion processing to the noble-metals salting in liquid for the process immersed in a stannous chloride solution and activation was conventionally performed at two processes, by moreover spraying this with a spray method at one process, in the case of this invention, a reaction can advance momentarily, and a metal can be deposited on a base material front face, and it is very efficient.

[0012] Moreover, the metal which the reducing agent acted, was returned on the base material side activated by said palladium, and separated sticks metal salting in liquid and a reducing-agent solution by spraying with a spray method. Since a solution is made to spray and react to a base material with a spray method also in this case, on a base material, a reaction advances momentarily and a metal deposits. It is different from a reaction advancing on a target serially in this point and the quiescence solution of a plating bath.

[0013]

[Embodiment of the Invention] First, the gestalt of the operation about the formation approach of the silver mirror plane concerning this invention is explained. The base material which forms a silver mirror plane will not be limited especially if it is bodies, such as a metal, synthetic resin, rubber, glass, pottery, timber, leather, a stone, gypsum fibrosum, rattan, and straw. Water purification washes to a soapy water pan, an oil content, fingerprint dirt, etc. adhering to the front face of these base materials are removed, and a water paste is

improved, and the preparation of surfaces is performed so that a silver mirror plane can form without nonuniformity.

[0014] If needed, synthetic resin, such as urethane system resin or acrylic resin, may be applied to a base material front face with a spray method etc., and a synthetic-resin layer may be formed in it on the surface of a base material. Moreover, it is desirable to spray the front face of a synthetic-resin layer with a spray method in etching reagents, such as a chromic anhydride used for pretreatment of the usual plastics plating, a sulfuric acid, and phosphoric acid, to roughen the front face of a synthetic-resin layer, and to raise the adhesion of a subsequent metal layer.

[0015] Next, activation is explained. As aforementioned, the example of representation of an activation agent is the solution which contains a hydrochloric acid 10 thru/or 40 cc, 1.5g of stannous chloride, 5g, 0.001g of palladium chlorides, and 0.005g to 1l. of water, and it is desirable to carry out a selection activity suitably in this range. Since it is determined mainly by relation with processing temperature and a reaction advances promptly in a summer, the low-concentration processing agent of whether which concentration is chosen is desirable, and since the reaction is loose in winter, it is desirable to speed up a reaction using a high-concentration processing agent.

[0016] Moreover, the spray for spraying an activity processing agent uses the spray gun equipped with the pressure tank usually used. A processing agent is uniformly applied to homogeneity with a spray at the whole. a spray — a configuration or a surface state of a base material etc. — suitably — 1 — or it carries out twice. Moreover, you may be the approach of replacing with the activation agent of 1 liquid to apply, containing the solution of hydrochloric acid of stannous chloride, and the solution of hydrochloric acid of a palladium chloride to a separate pressure tank, and spraying a simultaneous target by the double gun or the twin spray gun.

[0017] After carrying out the spray of the activator, it shifts to a washing process in the condition of having got wet, water purification is sprayed by the spray, and the residue of a before process is removed. under the present circumstances, an impurity does not adhere to the activation side formed at the before process — as — wash water — purified water with if possible few minerals etc. — or it is alike as much as possible, it sets, and distilled water or ion exchange water is desirable.

[0018] It shifts to the following silver-mirror-reaction processing agent spraying process in the condition [having still got wet] after ending a washing process, and the metal salt content solution and the reducing-agent content solution are contained to the respectively separate pressure tank, for example, a base material is simultaneously sprayed with a double gun, a twin spray gun, a sprayer, etc. Here, the typical example of combination of a silver-mirror-reaction processing agent is a passage according to claim 3 or 5, and it is the same as that of the case of said activation that it is desirable to choose proper loadings (concentration) according to a reaction condition from the starting range. Moreover, when it replaces with the silver-nitrate content solution of said combination and the solution of a copper sulfate or a nickel sulfate is used, the silver mirror plane (mirror plane) of copper or nickel is acquired. The solution of the formation approach of the starting mirror plane and a copper sulfate, or a nickel sulfate is also contained in this invention.

[0019] The 1st time, it is uniformly begun from the bottom to apply a spray, and it is applied until silver comes out to a front face so that it may finish with the upper part of a base material. Furthermore, a spray is repeated a total of 4 times from the location which applied caudad from the upper part of a base material, and set 10 thru/or spacing of 20 seconds, and separated a few from the base material. It cannot be overemphasized that the count of a spray can be suitably fluctuated according to the surface state and configuration of a base material.

[0020] the heater after a spray's washing again, removing Myst and the solvent of a before process after completing a silver-mirror-reaction processing agent spraying process and blowing away moisture by the Ayr blow subsequently — 10 — or it dries until moisture is thoroughly lost for 20 minutes.

[0021] The above is the main process of silver niveau formation. Accessories which gave coloring bright plating and which have a high-class feeling extremely can be obtained by applying for example, a transperence clear coating or a transperence coloring coating to the front face of the silver mirror plane acquired thus with a spray method.

[0022]

[Example] Next, solutions, such as the formation approach of the silver mirror plane concerning this invention and a metal salt, are explained based on a typical example. An example 1 gives creation of an activation agent and an example 2 gives creation of a silver-mirror-reaction processing agent, and the example about silver niveau formation further after an example 3.

[0023] an example 1 — first, the anhydride of stannous chloride is suitably dissolved in the hydrochloric acid of concentration, the solution of hydrochloric acid of stannous chloride is created, next anhydrous salt-ized palladium is suitably dissolved in the hydrochloric acid of concentration, and the solution of hydrochloric acid of a palladium chloride is created, just before using both the solution of hydrochloric acid, it mixes, and a spray is held and carried out to a pressure tank. Or both the solution of hydrochloric acid is held in the separate pressure tank, and you may use it according to a twin spray gun, a double gun, etc., spraying a simultaneous target.

[0024] A sodium-hydroxide water solution is added to an example 2, next the solution which added ammonia to the water solution of a silver nitrate, the metal salt content solution of predetermined concentration is created, next formalin is added to the water solution of a tartaric acid and a glucose, a reducing-agent content solution is created, the silver-mirror-reaction processing agent which consists of both solutions is independently held in the pressure tank, respectively, and it is used according to a twin spray gun, a double gun, etc., spraying a simultaneous target.

[0025] After carrying out the spray of the purified water and washing it to the base material of example 3 iron steel, the spray of the activation agent of an example 1 was carried out, the base material front face was activated, the spray of the silver-mirror-reaction processing agent created in the example 2 after rinsing was carried out, the silver mirror plane was formed, rinsing desiccation was carried out, and the gloss silver mirror plane was acquired. The clear coating which consists of acrylic resin was applied to the starting silver mirror plane with the spray method, and the skillful ornament material which shines silver was obtained.

[0026] The ornament material which an example 4 ABS-plastics base material is roughened with the etching reagent which consists of a chromic anhydride, a sulfuric acid, and a phosphoric acid, and the rest forms a silver mirror plane like an example 3, and said polyol and poly isocyanate are made to react, forms a coloring polyurethane paint film, and has clear metallic luster after applying the coating which added the coloring matter which becomes the mixture of polyol and the poly isocyanate from an organic system pigment to the starting silver mirror plane with a spray method was obtained.

[0027]

[Effect of the Invention] Since a gloss silver mirror plane can be acquired in a short time according to the process which the formation approach of the silver mirror plane concerning this invention is easy equipment by the spray method as mentioned above, and was moreover saved labor, the acquired silver mirror plane is extremely rich in gloss, and it not only excels economically [a large-scale facility like a conventional method is unnecessary, and], but it does so beautifully the outstanding effectiveness which is equal in any way as compared with electroplating. moreover, since it is extensively applicable to all base materials, such as a metal, synthetic resin, rubber, glass, pottery, timber, leather, a stone, gypsum fibrosum, rattan, and straw, utility value is very high, and if transperence coloring paint and clear paint are performed as a substrate of accessories, the surprise and impression which the accessories of the appearance which was extremely excellent in art are obtained, and have not been conventionally seen to what is seen will be given.

[Translation done.]

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平11-335858

(43) 公開日 平成11年(1999)12月7日

(51) Int.Cl.⁵

C 2 3 C 18/44
18/28

識別記号

F I

C 2 3 C 18/44
18/28

Z

審査請求 未請求 請求項の数 5 F D (全 4 頁)

(21) 出願番号 特願平10-161489

(22) 出願日 平成10年(1998)5月27日

(71) 出願人 398033600

鹿又 勇治

福島県いわき市小島町2丁目16-11

(71) 出願人 398033596

山村 攻

東京都江戸川区北小岩4丁目41番39号

(72) 発明者 鹿又 勇治

福島県いわき市小島町2丁目16-11

(72) 発明者 松堂 裕一

千葉県船橋市西船3丁目1番18号

(72) 発明者 三好 克典

千葉県船橋市大穴北3丁目40番5号

(74) 代理人 弁理士 小杉 武夫

最終頁に続く

(54) 【発明の名称】 銀鏡面の形成方法及びその溶液

(57) 【要約】

【課題】 鍍金浴に代えて、スプレー法によって、金属、合成樹脂、ゴム、ガラス、陶磁器、木材、皮革、石、石膏、籐、麦藁等に銀鏡面を得る。

【解決手段】 下地調整、活性化処理、水洗処理、金属塩と還元反応を経て銀鏡面を形成する方法であって、塩化第一錫とパラジウム、金、銀等の貴金属塩を含む活性化処理剤をスプレー法で吹付けることによって活性化処理（アクティベイティング）を施し、また、金属塩含有溶液と還元剤含有溶液からなる銀鏡反応処理剤をそれぞれスプレー法により同時に吹付けて銀鏡面を形成する。

【特許請求の範囲】

【請求項1】銀鏡面を形成する下地を調整し、該下地に活性化処理を施し、次いで、水洗処理し、金属塩と還元剤を反応させて銀鏡面を形成する方法であって、塩化第一錫とパラジウム、金、銀等の貴金属塩を含む活性化処理剤をスプレー法で吹付けることによって活性化処理（アクティブエーティング）を施し、また、金属塩含有溶液と還元剤含有溶液からなる銀鏡反応処理剤をそれぞれスプレー法により同時に吹付けることを特徴とする銀鏡面の形成方法。

【請求項2】前記活性化処理剤は、水1リットルに対して、塩酸10乃至40cc、塩化第一錫1.5g乃至5g、塩化パラジウム0.001g乃至0.005gを含有することを特徴とする請求項1記載の銀鏡面の形成方法。

【請求項3】前記銀鏡反応処理剤は、水1リットルに対して、水酸化ナトリウム6.0g乃至25g、アンモニア20g乃至70g、硝酸銀2g乃至20gを含有する金属塩含有溶液、及び、水1リットルに対して、酒石酸1g乃至4.5g、グルコース10g乃至50g、ホルムアルデヒド0.05g乃至3.5gを含有する還元剤含有溶液からなることを特徴とする請求項1記載の銀鏡面の形成方法。

【請求項4】銀鏡面を形成する下地を調整し、該下地に活性化処理を施し、次いで、水洗処理し、金属塩と還元剤を反応させて銀鏡面を形成する方法であって、塩化第一錫とパラジウム、金、銀等の貴金属塩を含む活性化処理剤をスプレー法で吹付けることによって活性化処理（アクティブエーティング）を施し、また、金属塩含有溶液と還元剤含有溶液からなる銀鏡反応処理剤をそれぞれスプレー法により同時に吹付けることを特徴とする銀鏡面の形成方法における活性化処理剤として、水1リットルに対して、塩酸10乃至40cc、塩化第一錫1.5g乃至5g、塩化パラジウム0.001g乃至0.005gを含有することを特徴とする塩酸溶液。

【請求項5】銀鏡面を形成する下地を調整し、該下地に活性化処理を施し、次いで、水洗処理し、金属塩と還元剤を反応させて銀鏡面を形成する方法であって、塩化第一錫とパラジウム、金、銀等の貴金属塩を含む活性化処理剤をスプレー法で吹付けることによって活性化処理（アクティブエーティング）を施し、また、金属塩含有溶液と還元剤含有溶液からなる銀鏡反応処理剤をそれぞれスプレー法により同時に吹付けることを特徴とする銀鏡面の形成方法における銀鏡反応処理剤として、水1リットルに対して、水酸化ナトリウム6.0g乃至25g、アンモニア20g乃至70g、硝酸銀2g乃至20gを含有する金属塩含有溶液、及び、水1リットルに対して、酒石酸1g乃至4.5g、グルコース10g乃至50g、ホルムアルデヒド0.05g乃至3.5gを含有する還元剤含有溶液。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、屋内装飾品、自動車部品、家庭電気機器、仏具、家具、装身具等に使われる基材に銀鏡面を形成する方法、特に、スプレー法によって、金属、合成樹脂、ゴム、ガラス、陶磁器、木材、皮革、石、石膏、籐、麦藁等に銀鏡面を形成する方法及び係るスプレー法において使用する金属塩等の溶液に関する。

10 【0002】

【従来の技術】従来、ABS樹脂等のプラスチックに化学鍍金を施す方法乃至その前処理方法が知られている。この化学鍍金法等は、先ず、プラスチックをエッチング液に15乃至30分間浸漬して表面を粗化し、次に、塩化第一錫の塩酸溶液の浴に浸漬し、水洗後活性化浴に浸漬し、更に水洗して鍍金浴に5乃至10分間浸漬した後、鍍金浴から引き上げ、水洗、乾燥する工程からなる。

【0003】前記の化学鍍金法によれば、被鍍金物を各工程ごとに鍍金浴に浸漬することから、鍍金浴を設置するのに大きなスペースを要し、また、工程に要する時間がかかり、更に、メンテナンスに手間を要しコストアップの原因ともなる等の問題があった。

20 【0004】

【発明が解決しようとする課題】本発明は、上記のような問題点を改善し、鍍金浴に代えて、スプレー法によって、金属、合成樹脂、ゴム、ガラス、陶磁器、木材、皮革、石、石膏、籐、麦藁等に銀鏡面を形成する方法及び係るスプレー法において使用する処理剤を提供することを目的とする。

30 【0005】

【課題を解決するための手段】前記の課題を解決するために、本発明は、銀鏡面を形成する下地を調整し、該下地に活性化処理を施し、次いで、水洗処理し、金属塩と還元剤を反応させて銀鏡面を形成する方法であって、塩化第一錫とパラジウム、金、銀等の貴金属塩を含む活性化処理剤をスプレー法で吹付けることによって活性化処理（アクティブエーティング）を施し、また、金属塩含有溶液と還元剤含有溶液からなる銀鏡反応処理剤をそれぞれスプレー法により同時に吹付けることを特徴とする銀鏡面の形成方法とする。

【0006】また、前記の課題を解決するために、本発明は、前記活性化処理剤は、水1リットルに対して、塩酸10乃至40cc、塩化第一錫1.5g乃至5g、塩化パラジウム0.001g乃至0.005gを含有することを特徴とする銀鏡面の形成方法とすることが好ましい。

【0007】また、前記の課題を解決するために、本発明は、前記銀鏡反応処理剤は、水1リットルに対して、水酸化ナトリウム6.0g乃至25g、アンモニア20g乃至70g、硝酸銀2g乃至20gを含有する金属塩

含有溶液、及び、水1リットルに対して、酒石酸1g乃至4.5g、グルコース10g乃至50g、ホルムアルデヒド0.05g乃至3.5gを含有する還元剤含有溶液からなることを特徴とする銀鏡面の形成方法とすることが好ましい。

【0008】また、前記の課題を解決するために、本発明は、銀鏡面を形成する下地を調整し、該下地に活性化処理を施し、次いで、水洗処理し、金属塩と還元剤を反応させて銀鏡面を形成する方法であって、塩化第一錫とパラジウム、金、銀等の貴金属塩を含む活性化処理剤をスプレー法で吹付けることによって活性化処理（アクティベーション）を施し、また、金属塩含有溶液と還元剤含有溶液からなる銀鏡反応処理剤をそれぞれスプレー法により同時に吹付けることを特徴とする銀鏡面の形成方法における活性化処理剤として、水1リットルに対して、塩酸10乃至40cc、塩化第一錫1.5g乃至5g、塩化パラジウム0.001g乃至0.005gを含有することを特徴とする塩酸溶液とする。

【0009】また、前記の課題を解決するために、本発明は、銀鏡面を形成する下地を調整し、該下地に活性化処理を施し、次いで、水洗処理し、金属塩と還元剤を反応させて銀鏡面を形成する方法であって、塩化第一錫とパラジウム、金、銀等の貴金属塩を含む活性化処理剤をスプレー法で吹付けることによって活性化処理（アクティベーション）を施し、また、金属塩含有溶液と還元剤含有溶液からなる銀鏡反応処理剤をそれぞれスプレー法により同時に吹付けることを特徴とする銀鏡面の形成方法における銀鏡反応処理剤として、水1リットルに対して、水酸化ナトリウム6.0g乃至25g、アンモニア20g乃至70g、硝酸銀2g乃至20gを含有する金属塩含有溶液、及び、水1リットルに対して、酒石酸1g乃至4.5g、グルコース10g乃至50g、ホルムアルデヒド0.05g乃至3.5gを含有する還元剤含有溶液とする。

【0010】

【作用】この発明の活性化処理に使用する塩化第一錫は、塩酸溶液中で還元性の第一錫イオンとなり、一方、パラジウム、金、銀等の貴金属塩は溶液中において金属イオン化され、両液をスプレー法で吹付けることにより、これらの貴金属の金属イオンは還元されて金属として基材の表面に析出し、第一錫イオンは第二錫イオンに酸化される。この析出した金属、特にパラジウムは活性に富み、銀鏡面を基材に密着させる作用に優れる。

【0011】従来、塩化第一錫溶液に浸漬する工程と活性化のための貴金属塩溶液への浸漬処理は二工程で行っていたのであるが、本発明の場合はこれを一工程でしかもスプレー法で吹付けることによって、瞬間的に反応が進行し金属を基材表面に析出させることができ、極めて効率が良い。

【0012】また、金属塩溶液と還元剤溶液をスプレー

法で吹付けることにより、前記パラジウムで活性化された基材表面上に、還元剤が作用して還元されて遊離した金属が密着する。この場合も、スプレー法によって溶液を基材に吹付けて反応させるので、基材上において瞬間的に反応が進行し金属が析出する。この点、鍍金浴の静止溶液中で逐次的に反応が進行することと相違する。

【0013】

【発明の実施の形態】先ず、この発明に係る銀鏡面の形成方法に関する実施の形態について説明する。銀鏡面を形成する基材は、金属、合成樹脂、ゴム、ガラス、陶磁器、木材、皮革、石、石膏、籐、麦藁等の物体であれば特に限定されない。石鹼水さらに浄水で洗浄し、これら基材の表面に付着している油分、指紋汚れ等を除去して水のりを良くし、銀鏡面がムラなく形成できるように下地調整を行う。

【0014】必要に応じて、基材表面にウレタン系樹脂またはアクリル系樹脂等の合成樹脂をスプレー法等によって塗布して基材の表面に合成樹脂層を形成してもよい。また、通常のプラスチック鍍金の前処理に使用する無水クロム酸、硫酸、りん酸等のエッチング液を合成樹脂層の表面にスプレー法で吹付けて合成樹脂層の表面を粗化してその後の金属層の密着性を向上させることが好ましい。

【0015】次に、活性化処理について説明する。活性化処理剤の代表例は前記の通り、水1リットルに対して、塩酸10乃至40cc、塩化第一錫1.5g乃至5g、塩化パラジウム0.001g乃至0.005gを含有する溶液で、この範囲において適宜選択使用することが好ましい。何れの濃度を選択するかは主として処理温度との関係で決定され、夏季には反応が速やかに進行するので低濃度の処理剤が好ましく、冬季には反応が緩やかなので高濃度の処理剤を使用して反応を速めることが好ましい。

【0016】また、活性処理剤を吹付けるためのスプレーは通常使用される圧送タンクを備えたスプレーガンを用いる。スプレーによって処理剤を全体に均一に万遍なく塗る。スプレーは基材の形状または表面状態等により適宜1乃至2回行う。また、係る一液の活性化処理剤に代えて塩化第一錫の塩酸溶液と塩化パラジウムの塩酸溶液を別々の圧送タンクに収納し、ダブルガンまたは双頭ガン等で同時に吹付ける方法であっても良い。

【0017】活性化剤をスプレーした後、濡れた状態で洗浄工程に移行し、スプレーで浄水を吹付けて前工程の残渣を取除く。この際、前工程で形成された活性化面に不純物が付着しないように洗浄水はなるべくミネラル分の少ない精製水乃至可能な限りにおいて、蒸留水またはイオン交換水等が好ましい。

【0018】洗浄工程を終了後、未だ濡れたままの状態ですべての銀鏡反応処理剤吹付け工程へ移行し、金属塩含有溶液と還元剤含有溶液をそれぞれ別々の圧送タンクに収

納しておき、例えば、ダブルガン、双頭ガン、噴霧器等によって同時に基材に吹付ける。ここで、銀鏡反応処理剤の代表的な配合例は請求項3または5記載の通りであり、係る範囲の中から反応条件に応じて適宜の配合量（濃度）を選択することが好ましいことは前記活性化処理の場合と同様である。また、前記配合の硝酸銀含有溶液に代えて硫酸銅または硫酸ニッケルの溶液を用いた場合には銅またはニッケルの銀鏡面（鏡面）が得られる。係る鏡面の形成方法及び硫酸銅または硫酸ニッケルの溶液も本発明に含まれるものである。

【0019】スプレーは1回目は万遍なく下から塗り始め、基材の上部で終わるように表面に銀色が出るまで塗る。更に、基材の上方から下方にかけて10乃至20秒の間隔をおいて且つ基材から少し離れた位置から、合計4回スプレーを繰り返す。スプレーの回数は基材の表面状態や形状に応じて適宜増減することができることは言うまでもない。

【0020】銀鏡反応処理剤吹付け工程が終了後、再度スプレーにて洗浄し、前工程のミストや溶剤を取り除き、次いでエアブローによって水分を吹き飛ばした後、ヒーターで10乃至20分間完全に水分が無くなるまで乾燥する。

【0021】以上が銀鏡面形成の主要工程である。斯くして得られた銀鏡面の表面に例えば、透明クリアー塗料または透明着色塗料をスプレー法によって塗布することによって、あたかも着色光沢鍍金を施したような極めて高級感のある装飾品を得ることができる。

【0022】

【実施例】次に、この発明に係る銀鏡面の形成方法及び金属塩等の溶液について代表的な実施例に基づいて説明する。実施例1は活性化処理剤の作成、実施例2は銀鏡反応処理剤の作成、更に、実施例3以降に銀鏡面形成に関する実施例を挙げる。

【0023】実施例1

先ず、塩化第一錫の無水物を適宜濃度の塩酸に溶解し塩化第一錫の塩酸溶液を作成し、次に、無水塩化パラジウムを適宜濃度の塩酸に溶解し塩化パラジウムの塩酸溶液を作成し、両塩酸溶液を使用直前に混合して圧送タンクに収容してスプレーする。または、両塩酸溶液を別々の圧送タンクに収容しておき、双頭ガンやダブルガン等に*

*よって同時に吹き付けて使用しても良い。

【0024】実施例2

次に、硝酸銀の水溶液にアンモニアを加えた溶液に水酸化ナトリウム水溶液を加えて所定濃度の金属塩含有溶液を作成し、次に、酒石酸とグルコースの水溶液にホルマリンを加えて還元剤含有溶液を作成し、両溶液からなる銀鏡反応処理剤をそれぞれ別々に圧送タンクに収容しておき、双頭ガンやダブルガン等によって同時に吹き付けて使用する。

10 【0025】実施例3

鉄鋼製の基材に精製水をスプレーして洗浄した後、実施例1の活性化処理剤をスプレーして基材表面を活性化し、水洗後実施例2で作成した銀鏡反応処理剤をスプレーして銀鏡面を形成し、水洗乾燥して光沢銀鏡面を得た。係る銀鏡面に、アクリル系樹脂からなるクリアー塗料をスプレー法で塗布して鮮やかな銀色に輝く装飾材を得た。

【0026】実施例4

ABS樹脂基材を無水クロム酸、硫酸、リン酸からなるエッチング液で粗化し、後は実施例3と同様にして銀鏡面を形成し、係る銀鏡面に、ポリオールとポリイソシアネートの混合物に有機系顔料からなる着色材を添加した塗料をスプレー法によって塗布した後、前記ポリオールとポリイソシアネートを反応させて着色ポリウレタン塗膜を形成して鮮明な金属光沢を有する装飾材を得た。

【0027】

【発明の効果】この発明に係る銀鏡面の形成方法は、前記のようにスプレー法による簡単な装置で、しかも、省力化された工程によって短時間で光沢銀鏡面を得ることができるので、従来法のような大がかりな設備は不要であって、経済的に優れているばかりでなく、得られた銀鏡面は極めて光沢に富み美しく鍍金法と比較して何ら遜色ない優れた効果を奏する。また、金属、合成樹脂、ゴム、ガラス、陶磁器、木材、皮革、石、石膏、籐、麦藁等あらゆる基材に広範に応用することができるので利用価値が極めて高く、且つ、装飾品の下地として透明着色塗装やクリアー塗装を施せば、極めて芸術性に優れた外観の装飾品が得られ、観るものに従来みたことがない驚きと感動を与える。

フロントページの続き

(72)発明者 高萩 明弘

福島県いわき市平下神谷字仲田21